

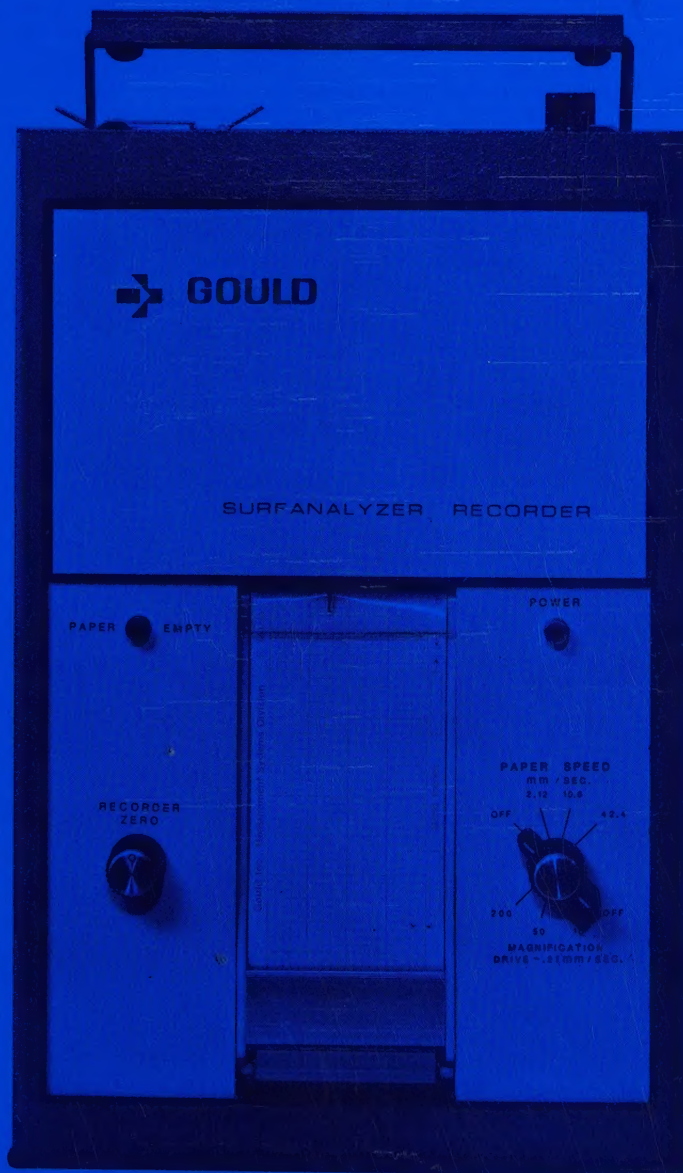
1600 SURFANALYZER RECORDER

File 21-1600-00

METER
GROUP
FILE

INSTRUCTION MANUAL

E. M. L.
File Copy



MP MASTER



MA34580



GOULD

WARRANTY

Each instrument manufactured by Gould Inc. is warranted to be free from defects in material and workmanship, and to operate in accordance with published specifications when used with the recommended Gould associate equipment and with Gould chart paper. Liability under this Warranty is limited to servicing or adjusting any instrument returned, transportation charges prepaid, to the factory for that purpose, and to replacing any defective parts, except tubes, fuses and batteries. This Warranty is effective for one year after date of delivery to the original purchaser. If defective operation has been caused by misuse or abnormal conditions of operation, repairs will be billed at our current rate, in which case an estimate will be furnished prior to starting of repair work. Freight on equipment returned to a customer in the U.S.A. will be paid by Gould. For this Warranty to be effective the return postpaid card, completely filled out, must be sent to Gould in El Monte, Calif., within thirty days of purchase or installation.

GOULD INC.

MEASUREMENT SYSTEMS DIVISION

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SECTION 1 — GENERAL INFORMATION

1.1 INTRODUCTION

The Gould 1600 single channel rectilinear recorder using a pressurized ink pen system is compatible with Gould's entire line of Surfanalyzers. Display may be in either English or metric units simply by changing to the appropriate chart paper.

1.2 SPECIFICATIONS

Recorder

Trace Presentation	Rectilinear
Trace Width	0.01 inch nominal (0.254 mm)
Writing System	Pressurized Ink
Pen Limiting	Electronic
Chart Paper Length	150 foot roll (45.7 meter)
Chart Divisions	20 Divisions in 2 inches 50 Divisions in 50 millimeters
Frequency Response	
DC to 35 Hz	±1% (Full Scale) 2" peak to peak ±1% (Full Scale) 50 mm peak to peak
DC to 100 Hz	−3 db 0.40 inch peak to peak −3 db 10.2 mm peak to peak

Controls

Zero Control	Full scale of recorder pen position
Recorder Control	Chart speed selection 0.1 ips 0.5 ips 2 ips 2.54 mm/s 12.7 mm/s 50.8 mm/s
Paper Empty	Red panel light comes on when paper needs replacing.

Electrical System

Type	20 kHz Carrier System
------	-----------------------

Warm-Up

Immediate

Power Input

90-125 VAC, 60 Hz, 20 Watts

Mechanical

Size	5.5" x 8.5" x 14.5" overall (140 x 216 x 368 mm)
Weight	14 Pounds (6.4 kg)

Environment

Storage	−40 to +160 °F (−40 to +71 °C)
Operating	+32 to 131 °F (0 to +55 °C)
Within Spec.	±20 °F from temp at calibration (±11 °C)

1.3 SUPPLIES

Analog Pen	11-2823-33
Chart Paper	11-2913-33 (inch) 11-2913-22 (metric)
Ink Cartridge	11-2735-04
Band Replacement Tool	341409-915
Gram Gage	240601-910
Wrench, Band Replacement (Bristol)	1-120122-3
Wrench, Pen Replacement	1-120922-18
Wrench, Band Replacement (Hex)	24518-5
Wrench, Pen Pressure Adjustment	1-120922-2

SECTION II — INSTALLATION

2.1 GENERAL

This section describes and illustrates proper electrical connections to the Gould 1600 Surfanalyzer Recorder.

2.2 POWER

Connect the recorder cable from the controller to the recorder.

Turn on the surfanalyzer control power switch.

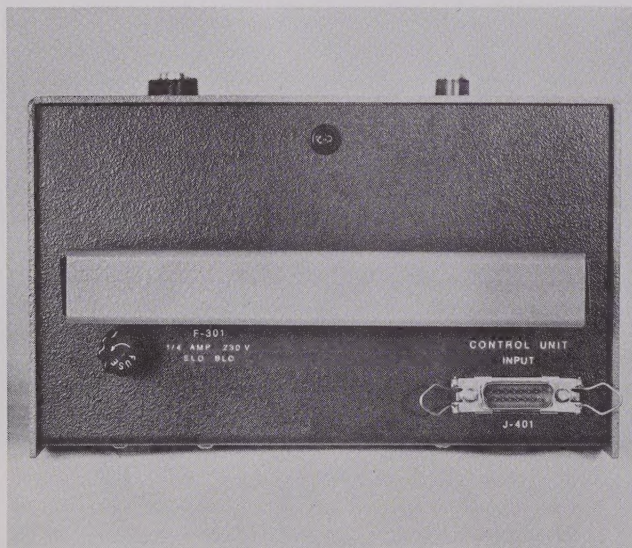


Figure 2.0.

Figure 2.1 shows the various operating controls.

The unit is now ready to use.

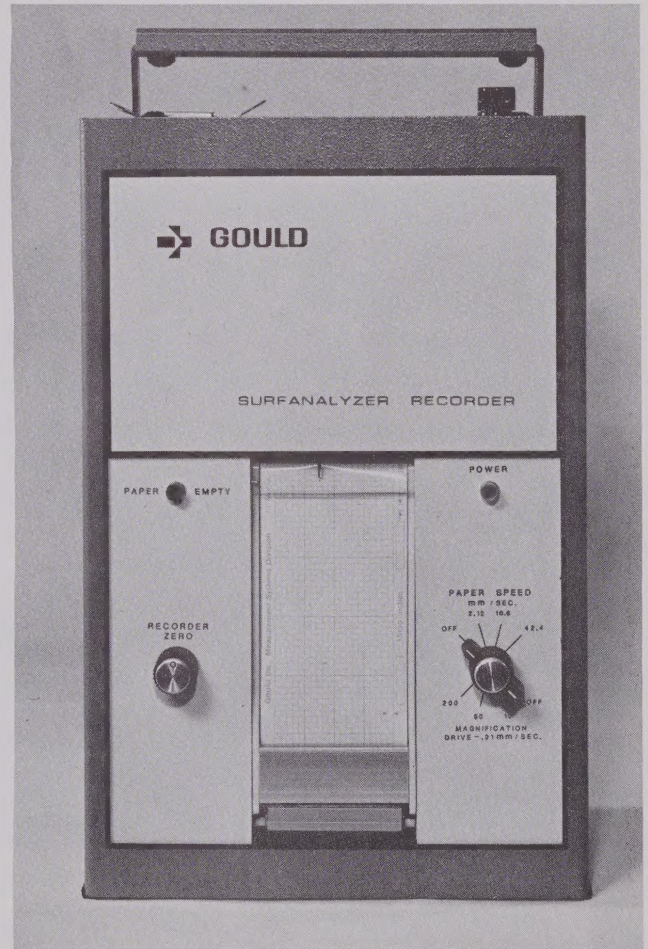


Figure 2.1.

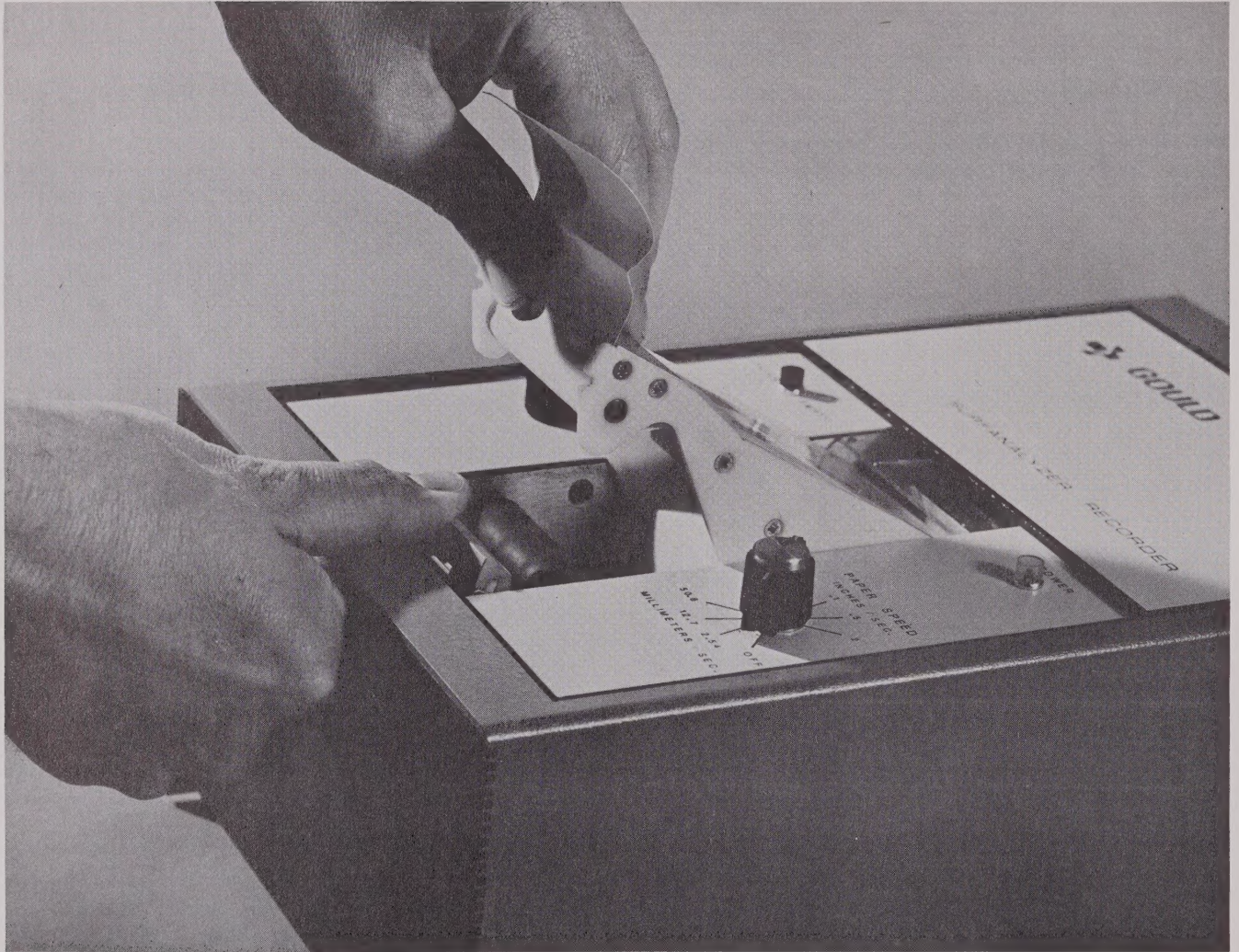


Figure 3.1.

SECTION III – SERVICING

3.1 GENERAL

This section describes and illustrates chart paper loading. This procedure can be quickly and easily performed by the operator.

3.2 CHANGING CHART PAPER

1. Turn chart speed off.
2. Release writing table by depressing latching bar. Remove table from recorder. (See Figures 3.1 and 3.2.)
3. Depress plungers on each end of spool and remove empty chart paper core.
4. Slide new chart paper roll onto spool, and insert spool into the grooves on the side plates of the writing table. Push spool up until plungers engage the holes in the side plates.
5. Feed the paper over the top of the writing surface, and behind pressure roll. (See Figure 3.2.)
6. Slide writing table asm onto the recorder guide pins and snap into place.
7. Operate recorder and run out one or two feet of chart paper to align paper.
8. Stop recorder.
9. Unit is ready for use.

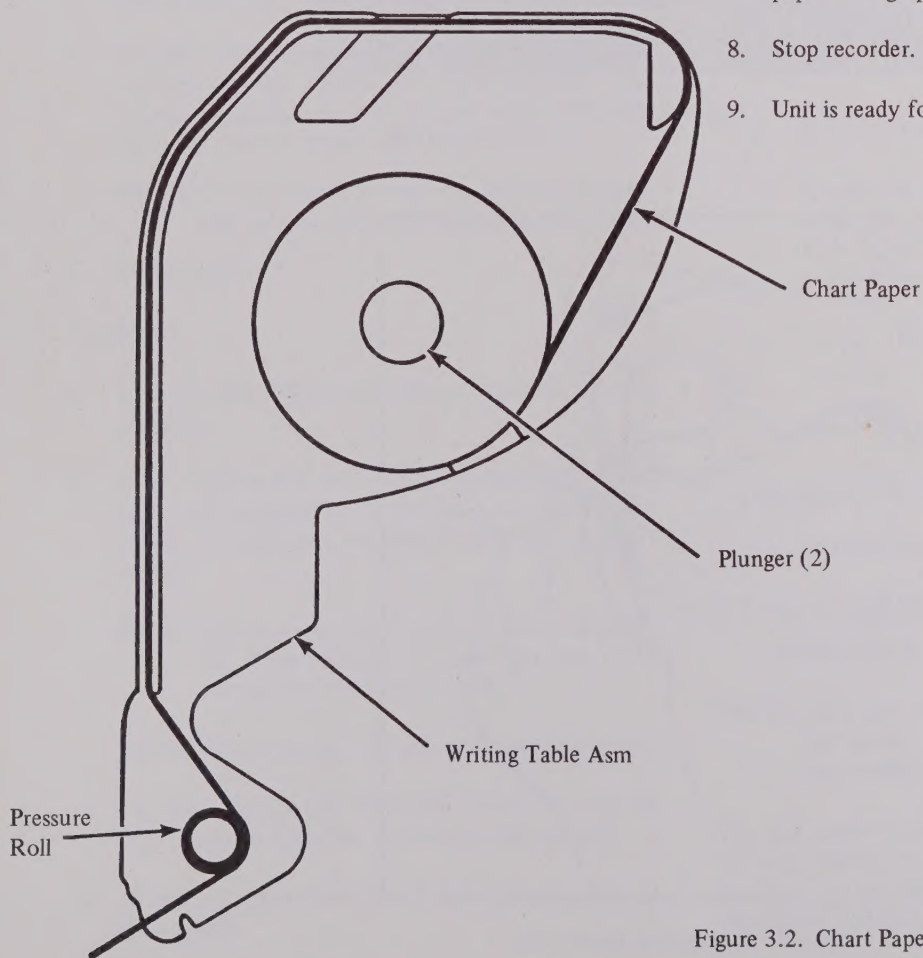


Figure 3.2. Chart Paper Threading Diagram

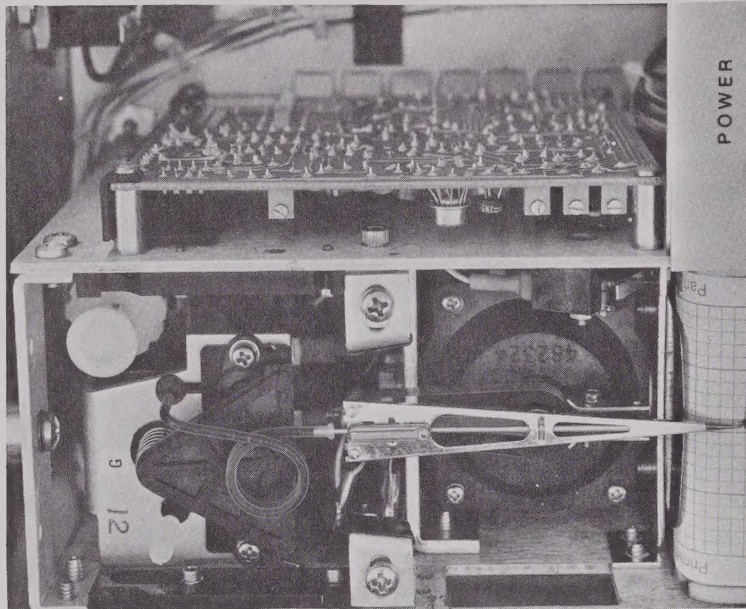


Figure 4.1.

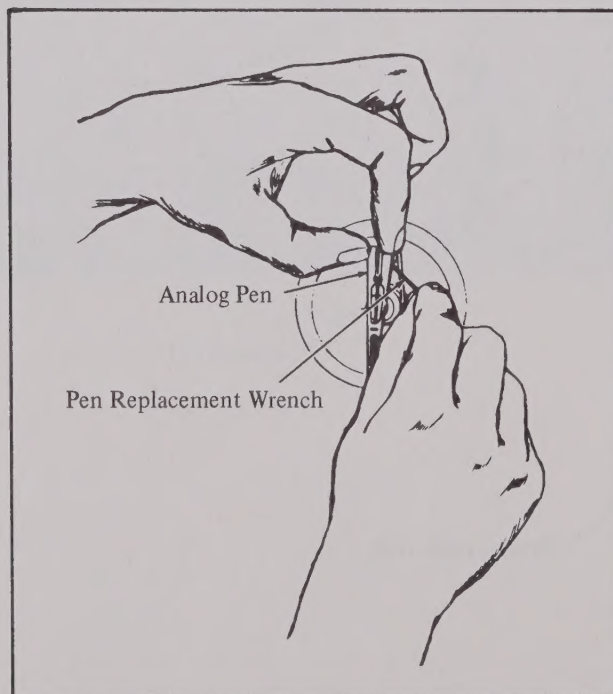


Figure 4.2. Replacing Analog Pen

SECTION IV – MAINTENANCE

4.1 GENERAL

This section describes and illustrates routine maintenance procedures that can easily be performed by a qualified service technician.

4.2 REPLACING ANALOG PEN

This paragraph describes and illustrates removal and installation of the analog pen.

1. Removal (See Figure 4.1)

- a. Remove top cover.
- b. Gently remove pen ink tube from manifold nipple.
- c. Use pen replacement wrench (Gould part number 1-120922-2) and loosen set screw one-half turn through access hole in side of pen motor drive arm shaft, and remove wrench. (See Figure 4.2)

NOTE: Do not loosen set screw more than one-half turn or pen cannot be removed from shaft.

- d. Remove pen.

2. Installation

- a. Carefully slide replacement pen onto pen motor drive arm shaft.
- b. Align screw in pen hub with access hole in drive arm shaft and “snug-up” set screw using pen replacement wrench (Gould part number 1-120922-2). Remove wrench.

NOTE: Set screw should be tight to create friction, but loose enough to allow the pen to be rotated in the pen motor hub.

- c. Connect ink tube between pen and manifold nipple.
- d. Manually depress ink manifold control bar and lift pen slightly to allow ink to bleed through pen tip.
- e. Gently grasp pen near hub and move pen across entire chart width.

- f. If ink trace is not parallel to a horizontal time line, gently turn the pen in the pen motor drive arm until trace is parallel to time line.
- g. Tighten set screw securing pen in pen motor drive arm shaft and remove wrench.
- h. A new pen must be lapped before proceeding. Carefully raise pen tip just enough to slide a small strip of emery paper (3M wet or dry Tri-M-ite paper, Grit M600, Gould part number 669234) under pen tip.
- i. Holding emery paper firmly, move pen back and forth five or six times.

CAUTION: Make sure that emery paper is held flat against the chart paper to insure proper lapping of pen.

- j. Remove emery paper and operate recorder.
- k. Check pen for dryness by wiping index finger with moderate pressure, across trace approximately one inch below pen. If trace does not smear, pen is properly lapped.
- l. If ink trace smears, refer to Paragraph 4.5, Pen Lapping.
- m. Check pen pressure as described in Paragraph 4.4.
- n. Install top cover.
- o. Surfanalyzer is ready for operation.

4.3 REPLACING PEN MOTOR BAND ASSEMBLY

NOTE: Drive arm assembly is a non-replaceable part of the pen motor. If drive arm is broken or damaged in any way, entire pen motor must be replaced.

The pen motor band assembly (Gould part number 682143, 50 mm) should not be removed unless broken. Because the band tension is critical, a band replacement tool (part number 341409-915) must be used to replace band assembly.

NOTE: Pen motor need not be removed from unit.

1. Remove analog pen (Paragraph 4.2).
2. Remove socket-head screw and band clamping (curved) washer that secures band assembly to drive arm (use wrench 1-120922-3).
3. Remove two socket-head screws and lock washers securing band assembly to drive arm bracket. Discard damaged band assembly (use wrench 245218-5).

CAUTION: To prevent damage to the new band assembly, check to be sure drive arm and bracket are free of nicks, dirt, ink before installing new band assembly.

4. Position new band assembly around drive arm hub and install band clamping washer and socket-head screw. Do not tighten screw.

NOTE: Check to be sure curved portion of washer is positioned to conform to the radius of the drive arm hub. Use care not to nick or scratch band assembly.

5. Align band assembly mounting holes with tapped holes in drive arm bracket and install two screws and lock washers. Do not tighten screws.

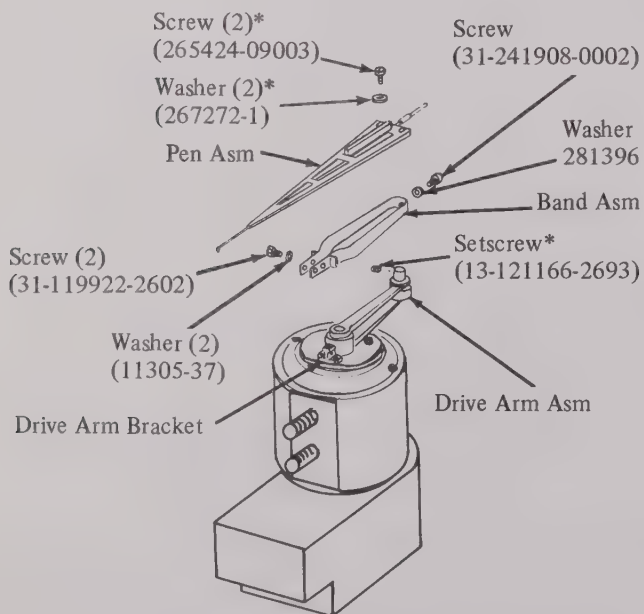


Figure 4.3. Penmotor Assembly

6. Inspect band for proper positioning around drive arm hub so that equal pressure is maintained on top and bottom of band assembly.
7. Install band tool on pen motor and thread knurled thumb screw into drive arm bracket. (Refer to Figure 4.3)
8. Depress plunger and insert locking pin into two small holes of band assembly, making certain plunger is behind locking pin.
9. Tighten two screws in drive arm bracket, loosen one quarter turn, move drive arm back and forth several times to center band assembly and tighten screws.
10. Move drive arm back and forth several times to center band assembly on drive arm and tighten socket-head screw securing band assembly to drive arm.

NOTE: Do not tighten more than 22 inch-ounces.

11. Depress plunger and remove locking pin. (See Figure 4.4)
12. Loosen knurled screw securing band tool to drive arm bracket and remove tool.
13. Apply glyptal cement (or equivalent) to heads of the three screws to prevent working out.
14. Install Analog Pen (Paragraph 4.2).

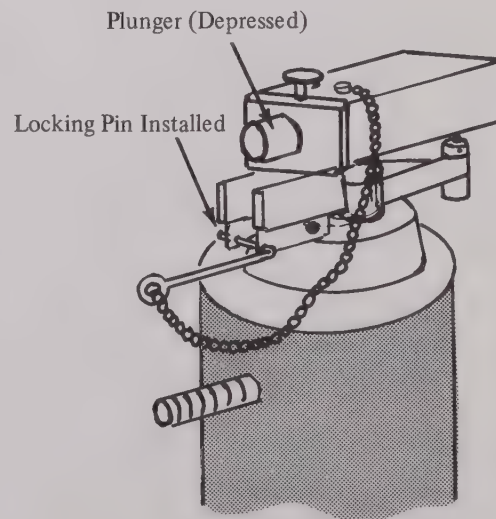


Figure 4.4. Band Tool Mounting

4.4 PEN PRESSURE MEASUREMENT AND ADJUSTMENT

Pen pressure should be checked if the ink trace is excessively wide (bleeding), indicating low pen pressure or if pen gouges the chart paper, indicating excessive pen pressure.

NOTE: Wide trace may also indicate an improperly lapped pen. Refer to Paragraph 4.5 for pen lapping procedures.

The gram gage (part number 240601-910) is used to measure the pressure of the pen as follows:

1. Operate recorder. (See Figures 4.5 and 4.6)
2. Place gram gage hook under pen shaft as close as possible to tip and form a right angle to pen shaft with gage hook.
3. Pull pen from chart and take reading on gage the moment excessive ink starts to flow from pen.
4. Proper writing pressure for analog pen is 28 to 32 grams.

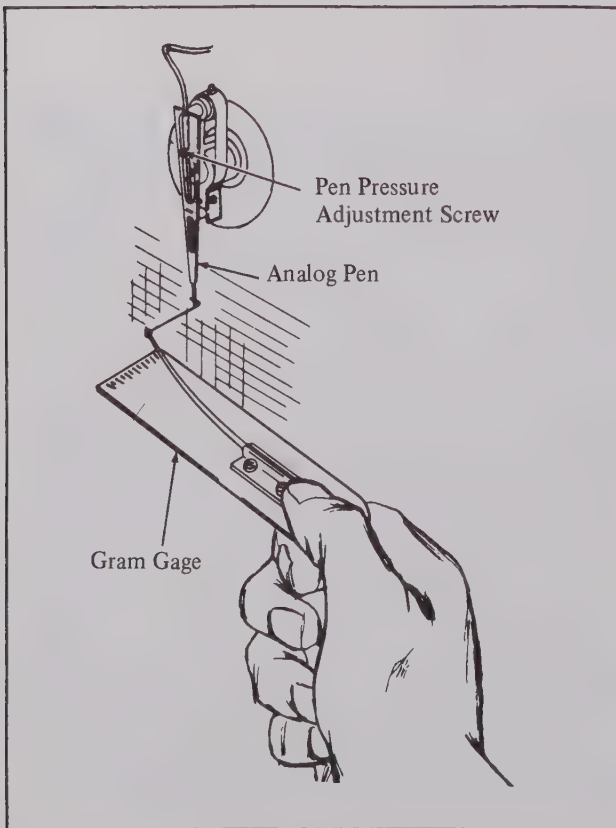


Figure 4.5. Pen Pressure Measurement

5. Use pen pressure adjustment wrench (part number 1-120922-18) and turn adjusting screw clockwise to increase pressure or counter-clockwise to decrease pressure.
6. Check pen pressure with gram gage and continue adjustment until proper reading is obtained.
7. When pen pressure is correct, turn recorder off.

4.5 PEN LAPPING

1. General

This paragraph describes and illustrates the proper procedures for lapping the analog and event pens. Intermittent or "wet" ink traces are indications that pen pressure is incorrect or that pen requires lapping. Check for "wet" writing by operating the recorder (no signal applied). Check pen trace by wiping index finger, with moderate pressure, across trace approximately one inch below pen tip. If ink does not smear, pen is properly lapped. If trace smears, check and adjust pen pressure

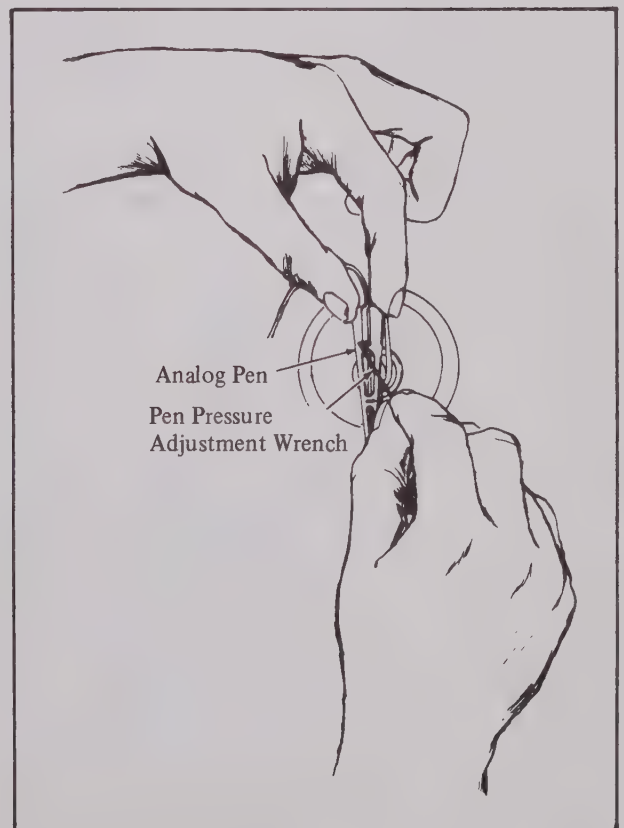


Figure 4.6. Pen Pressure Adjustment

(Paragraph 4.4). Repeat test, and if trace continues to smear, lapping is required.

2. Lapping Procedures

NOTE: Lapping of pens should only be done when required.

- a. Carefully raise pen tip just enough to slide a small strip of emery paper (4/0) under pen tip (Gould part number 141119). (See Figure 4.7)

CAUTION: Do not use a coarse or very abrasive type of emery paper. Use only the grade specified.

- b. Holding emery paper firmly, move pen back and forth five or six times.

CAUTION: Make sure that emery paper is held flat against the chart paper to insure proper lapping of pen.

- c. Remove emery paper and operate recorder.
- d. Check pen for dryness by wiping index finger with moderate pressure, across trace approximately one inch below pen. If trace does not smear, pen is properly lapped.
- e. Repeat steps a thru d as required to obtain dry trace.

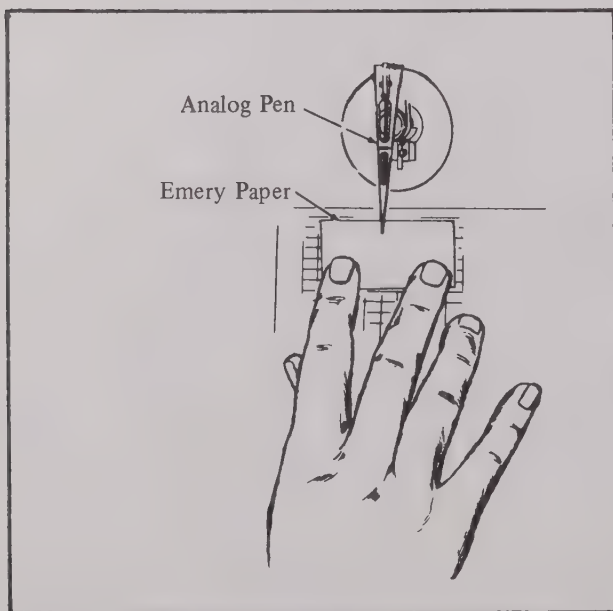


Figure 4.7 Pen Lapping

- f. If pen tip should become blocked during lapping operation, touch pen at top of pen (above tip) with a hot soldering iron for a few seconds with the pen tip raised slightly off the paper. This will usually start ink flowing and flush out abrasive.

NOTE: If procedure is repeated more than three times, recheck pen pressure and repeat lapping. Strict adherence to above lapping procedures is imperative.

- g. When dry trace is achieved, turn recorder off.

4.6 INK CARTRIDGE REPLACEMENT

(See Figure 4.8)

1. Removal

- a. Remove Surfanalyzer top cover.
- b. Turn locking nut full clockwise to shut off any ink flow.
- c. Pull up on pressure activating screw and remove ink cartridge from its mounting base. Discard empty cartridge.

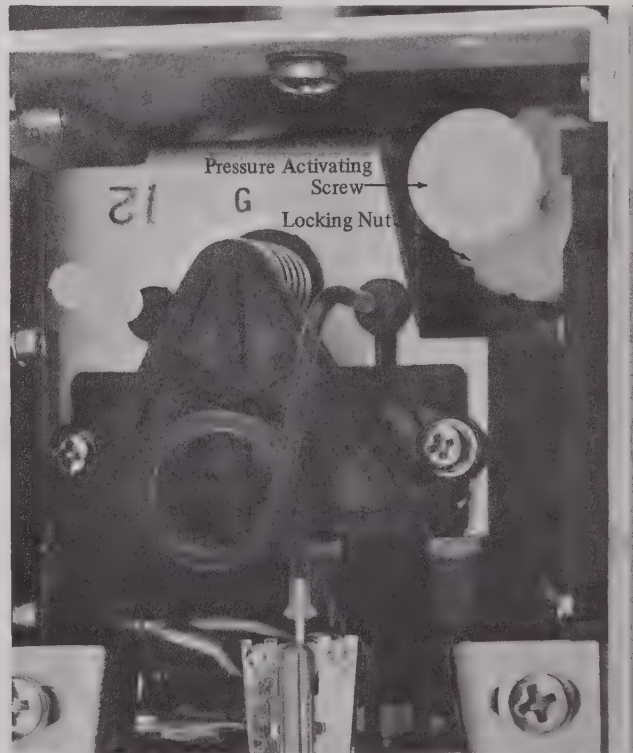


Figure 4.8 Replacing Ink Cartridge

2. **Installation**

- a. Remove shipping cap from ink cartridge.
- b. Install new ink cartridge by sliding cartridge into mounting base.
- c. Pressurize ink system by screwing knurled nut counterclockwise until knurled nut is in contact with knurled screw.
- d. Recorder is ready for use.

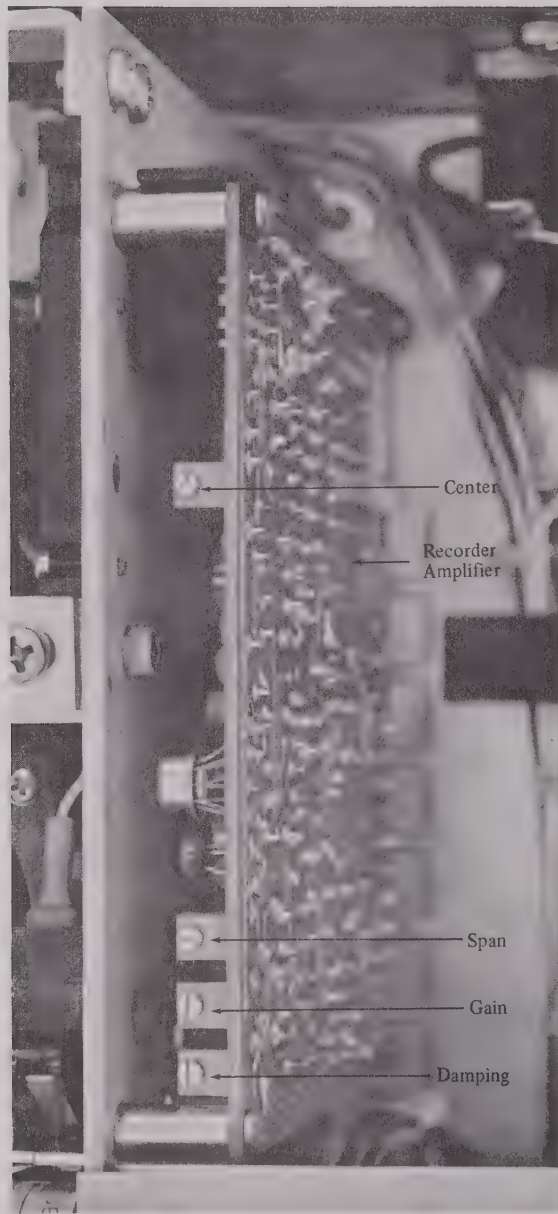


Figure 5.1.

SECTION V – CALIBRATION

5.1 GENERAL

The Gould 1600 Surfanalyzer Recorder has been factory calibrated, and under normal conditions will not require calibration. However, because of parts replacement or repair, calibration may be necessary. This section describes and illustrates the correct calibration procedures. It should be pointed out that calibration should only be performed by qualified personnel familiar with procedures and standards.

5.2 INITIAL SETUP

1. Remove the top cover of the 1600 Recorder.
2. Connect controller to 115 VAC, 60 Hz.
3. Connect d.c. calibrator (Cohu Model 325 or equivalent) between hi and lo pins of test board (pins 3 and 8 of J402). Set d.c. calibrator for zero volts output.
4. Turn on a.c. power to controller.

5.3 RECORDER ZERO SET (See Figure 5.1)

1. Allow 10-15 minutes warm-up for all equipment.
2. Adjust recorder zero control until pen is at the center line of the chart.
3. Loosen zero knob and with pen at chart center line, adjust zero knob index to vertical position. Retighten zero knob.

X = Test Point & Controls
Ref. Schematic

5.4 RECORDER SPAN, LIMIT, CENTER AND GAIN SET

1. Use setup of Paragraph 5.3 above.
2. Set pen at chart center.
3. Set d.c. calibrator for +2.0 volts output.
4. Adjust span control (see figure for adjustment pot location) for approximately $\frac{1}{2}$ chart division over range (beyond chart edge).
5. Switch d.c. calibrator to -2.0 volts.

6. Adjust limit, center and span control pots until pen position goes approximately $\frac{1}{2}$ chart division over range for both ± 2.0 volt signal.
7. Set d.c. calibrator for exactly +1.563 volts (monitor the voltage with a dvm).
8. Adjust the gain potentiometer of the recorder amplifier until the pen goes exactly +10 divisions from chart center when +1.563 volts is applied.
9. Set the d.c. calibrator for -1.563 volts and check for exactly -10 divisions from chart center. If non-symmetrical, repeat steps 1 thru 9.

5.5 RECORDER FREQUENCY RESPONSE

1. Apply a 5.5 Hz sine wave signal to input terminals 3 (hi) 8 (lo) of test board.
2. Adjust sine wave generator for a deflection of exactly 5 divisions peak to peak.
3. Switch generator to 55 Hz and adjust damping control for 5 divisions peak to peak.
4. Switch generator back to 5.5 Hz and check for 5 divisions peak to peak. Adjust generator if required.
5. Repeat steps 3 and 4 until there is no difference between the deflection at 5.5 and 55 Hz.
6. Switch to 3.5 Hz and adjust generator for 20 divisions peak to peak (full scale).
7. Switch to 35 Hz.
8. Adjust damping control for 20 divisions peak to peak if necessary.
9. Apply one cycle sine wave of sufficient amplitude to produce pen deflection to 5 divisions and increase frequency to 70 Hz. Peak to peak amplitude should be flat $\pm \frac{1}{4}$ divisions over the entire range.
10. Repeat steps 1 thru 9 if necessary.
11. Disconnect input signal.

SECTION VI — THEORY OF OPERATION

6.1 GENERAL

The penmotor drive amplifier is a complete servo-type system utilizing a metrisite transducer in the penmotor to develop position and electronically derived velocity and acceleration signals. These signals are summed with an input signal in a d-c error amplifier that supplies power for driving the oscillographic penmotor.

The penmotor connects electrical signals to the mechanical pen which records through a balanced hydrostatic ink system on chart paper which is driven past the pens by a motor.

6.2 RECORDER SERVO SYSTEM

The recorder amplifier assembly (refer to schematic 239163) consists of four main sections: input preamplifier; limiter section; error amplifier; and oscillator-demodulator.

1. Preamplifier

The preamplifier consists of integrated circuit U-101 and its associated components. The actual sensitivity is determined by resistors R101 and R102. Resistor R102 sets the gain of the amplifier. Resistor R101 serves to protect the input.

2. Limiter

Integrated circuit U-102 and its associated components form the limiter. In the linear operating range of the amplifier, the gain is set by resistors R105 and R106. The

input signal comes directly through until the output voltage is great enough to trigger zener diode CR103 or CR106, and the output is kept from swinging further.

3. Error Amplifier

The error amplifier is composed of operational amplifier U-103, transistors Q-101, Q-102, Q-103, Q-104 and associated components. The input signal is applied to the amplifier through resistor R109. A current proportional to the actual pen position is applied through resistor R-123. If the two currents are equal but opposite in polarity, the pen is in the proper position, so there is no error. However, when the pen is not in the correct position, the error amplifier senses the inequality and applies power to the penmotor drive coil to move the pen to correct the error.

Transistors Q-110 and Q-111 are used to obtain the necessary current to drive the primary of the metrisite feedback element and demodulator transistor Q-107 and Q-108.

The output of the metrisite is an amplitude-varying, 20 kHz signal. The signal is demodulated by the phase sensitive demodulator (Q-107 and Q-108) and filtered to be used as the position feedback voltage.

4. Oscillator-Demodulator

The oscillator U-104 is of the same type as used for the probe carrier amplifier system. Capacitors C102, C103 and resistors R137 and R138 form the Wein Bridge network. Q109 functions as the amplitude controller.

SECTION VII — TROUBLESHOOTING

7.1 GENERAL

This section contains a troubleshooting table to assist operating personnel in isolating malfunctions that may occur during normal operation of recorder.

CAUTION: Any service that may be required in this section should be performed only by qualified service personnel.

7.2 TROUBLESHOOTING TABLE

Malfunction	Cause	Remedy
1. Recorder inoperative	(a) Main power not connected to source	Connect power to source
	(b) Power on-off switch in off position	Switch to on position
	(c) Blown fuse	Replace fuse (F301)
	(d) Open interlock	
	1) Paper supply exhausted	Install new roll
	2) Writing table not engaged	Engage properly
	(e) Defective interlock switch	Repair and/or replace
2. No power to pen (pen limp)	(f) Defective on-off switch	Replace
	(a) Power on-off switch in off position	Switch to on position
	(b) Blown fuse	Replace fuse (F301)
3. Chart paper drive does not operate	(c) Main power not connected to source	Connect to correct power source
	(a) Power switch in off position	Switch to on position
	(b) Paper supply exhausted	Install new roll
	(c) Writing table improperly engaged	Engage properly
	(d) Defective interlock switch	Repair and/or replace
	(e) Defective motor	Replace

4. Chart paper speed incorrect	(a) Incorrect line frequency	Check for correct line frequency
	(b) Defective motor	Replace
5. Pen writes intermittently or not at all	(a) Insufficient writing fluid supply	Replace ink cartridge (See Paragraph 4.6)
	(b) Pen Clogged	Clean pen by applying heat to tip
	(c) Ink valve off	Turn ink valve to on position
6. Pen trace extremely heavy	(a) Improper pen pressure	Adjust pen pressure (See Paragraph 4.4)
	(b) Pen not in full contact with paper	Lap pen (See Paragraph 4.5)
	(c) Pen not in contact with paper, due to wear on tip of pen	Replace pen (See Paragraph 4.2)
	(d) Noise coming thru drive amplifier, or signal source	Eliminate noise source
	(e) Wide wet traces	Lap pen
7. Pen gouges or tears paper	(a) Improper pen pressure	Adjust pen pressure (See Paragraph 4.4)
	(b) Paper not centered	Center paper on writing table (See Paragraph 3.2)
	(c) Defective pen tip	Lap pen (See Paragraph 4.5)
8. Pen will not travel on time line	(a) Improper pen alignment	Align pen (See Paragraph 4.2)
	(b) Loose Pen	Align and tighten pen
9. Pen does not return to same spot	(a) Loose pen	Align and tighten pen (See Paragraph 4.2)
10. Pen does not move with input signal applied	(a) Blown fuse	Replace fuse
	(b) Defective preamplifier	Replace and/or repair
	(c) Defective drive amplifier and/or Power supply	Replace and/or repair
	(d) Defective cabling, and/or connections	Replace and/or repair
	(3) Defective probe or carrier amp.	Replace and/or repair

SECTION VIII – PARTS IDENTIFICATION

8.1 GENERAL

This recorder has been accurately calibrated and adjusted before shipment from the factory and should give long, trouble-free service. For servicing beyond the scope of the instructions contained in this manual or the technical equipment available, contact your nearest Gould Service Engineer listed on the warranty card shipped with the recorder.

The following parts lists and schematic diagrams are designed to assist in servicing and repairing the recorder.

NOTE: Check to be sure the schematic number and revision letter stamped on the rear of the recorder agree with the number and revision letter on the schematic contained in this section.

To assure prompt and satisfactory delivery of replacement parts, include the following with the purchase order:

1. Name, model number and serial number of the instrument. For example: Gould Surfanalyzer, Model 21-1600-00, S/N _____ .
2. Description of the part as listed in the manual.
3. Gould part number.

NOTE: Do not use the SYMBOL NUMBER from the parts list for identifying desired parts on the order.

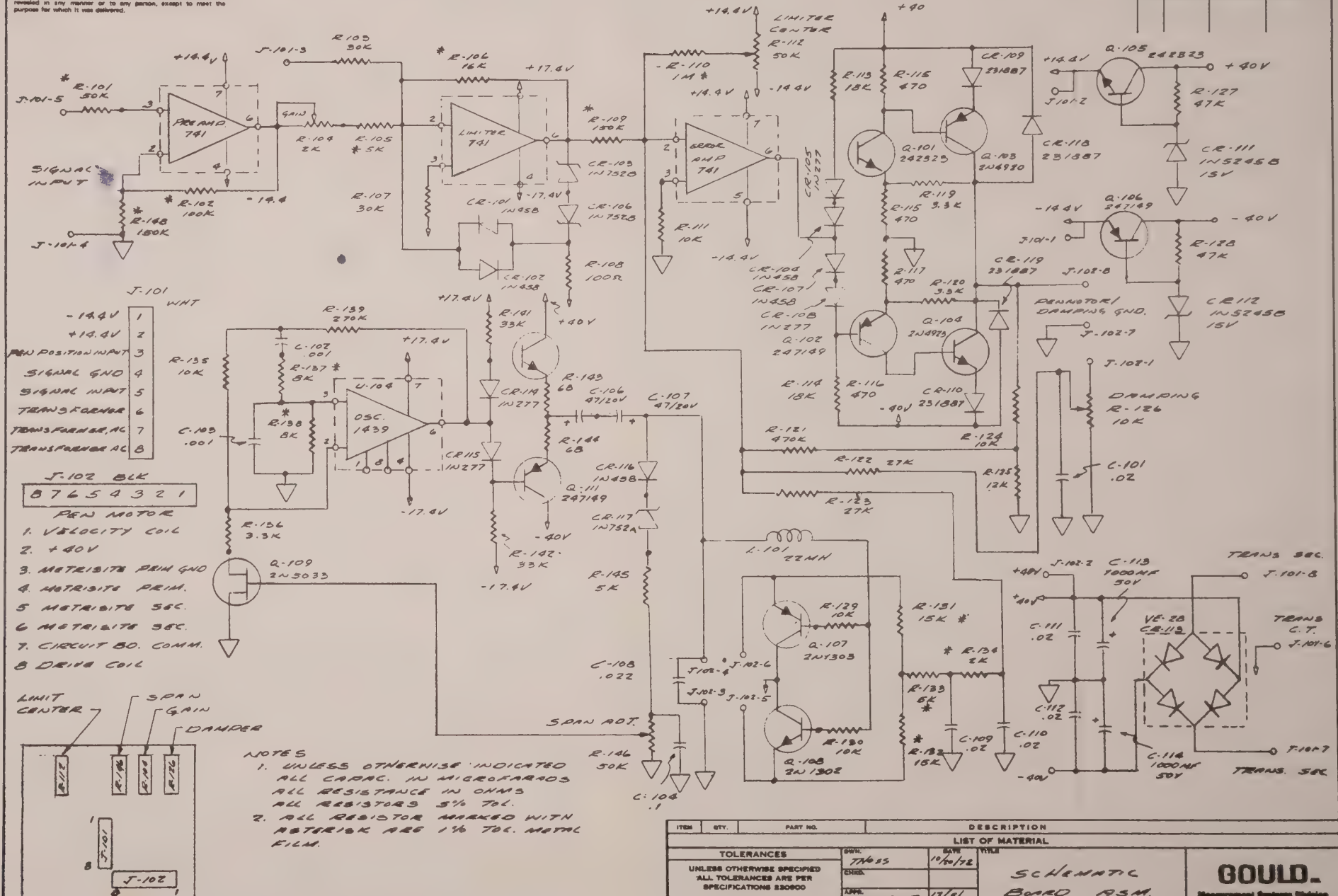
SYMBOL NO.	PART NUMBER	DESCRIPTION
C-109	20-247195-203	Capacitor
C-110	20-247195-203	Capacitor
C-111	20-247195-203	Capacitor
C-112	20-247195-203	Capacitor
C-113	50-281295-108	Capacitor
C-114	50-281295-108	Capacitor
CR-101	244896	Diode, 1N458A
CR-102	244896	Diode, 1N458A
CR-103	249747	Diode, Zener, 1N752A
CR-104	244896	Diode, 1N458A
CR-105	244311	Diode, 1N277
CR-106	249747	Diode, Zener, 1N752A
CR-107	244896	Diode, 1N458A
CR-108	244311	Diode, 1N277
CR-109	231887	Diode, S1-1
CR-110	231887	Diode, S1-1
CR-111	230061-4	Diode, Zener, 1N4746
CR-112	230061-4	Diode, Zener, 1N4746
CR-113	282295-5	Diode, Rectifier, VE-28
CR-114	244311	Diode, 1N277
CR-115	244311	Diode, 1N277
CR-116	244896	Diode, 1N458A
CR-127	249747	Diode, Zener, 1N752A
J-101	281711	Connector
J-102	281711	Connector

ELECTRICAL PARTS LIST DRIVE AMPLIFIER BOARD ASM 882358

SYMBOL NO.	PART NUMBER	DESCRIPTION
C-101	20-247195-203	Capacitor
C-102	10-247116-102	Capacitor
C-103	10-247116-102	Capacitor
C-104	230098-104	Capacitor
C-106	262585-475	Capacitor
C-107	262585-475	Capacitor
C-108	10-125904-223	Capacitor
Q-101	242323	Transistor
Q-102	247149	Transistor
Q-103	230058-3	Transistor, 2N4920
Q-104	230057-3	Transistor, 2N4923
Q-105	242323	Transistor
Q-106	247149	Transistor
Q-107	240236	Transistor, 2N1303
Q-108	240237	Transistor, 2N1302
Q-109	281857-2	Transistor, 2N5033
Q-110	242323	Transistor
L-101	263453-1	Reactor

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REVISIONS			
BY	EO NO	DATE	APPROVED
B	2530	2-28-74	JH693

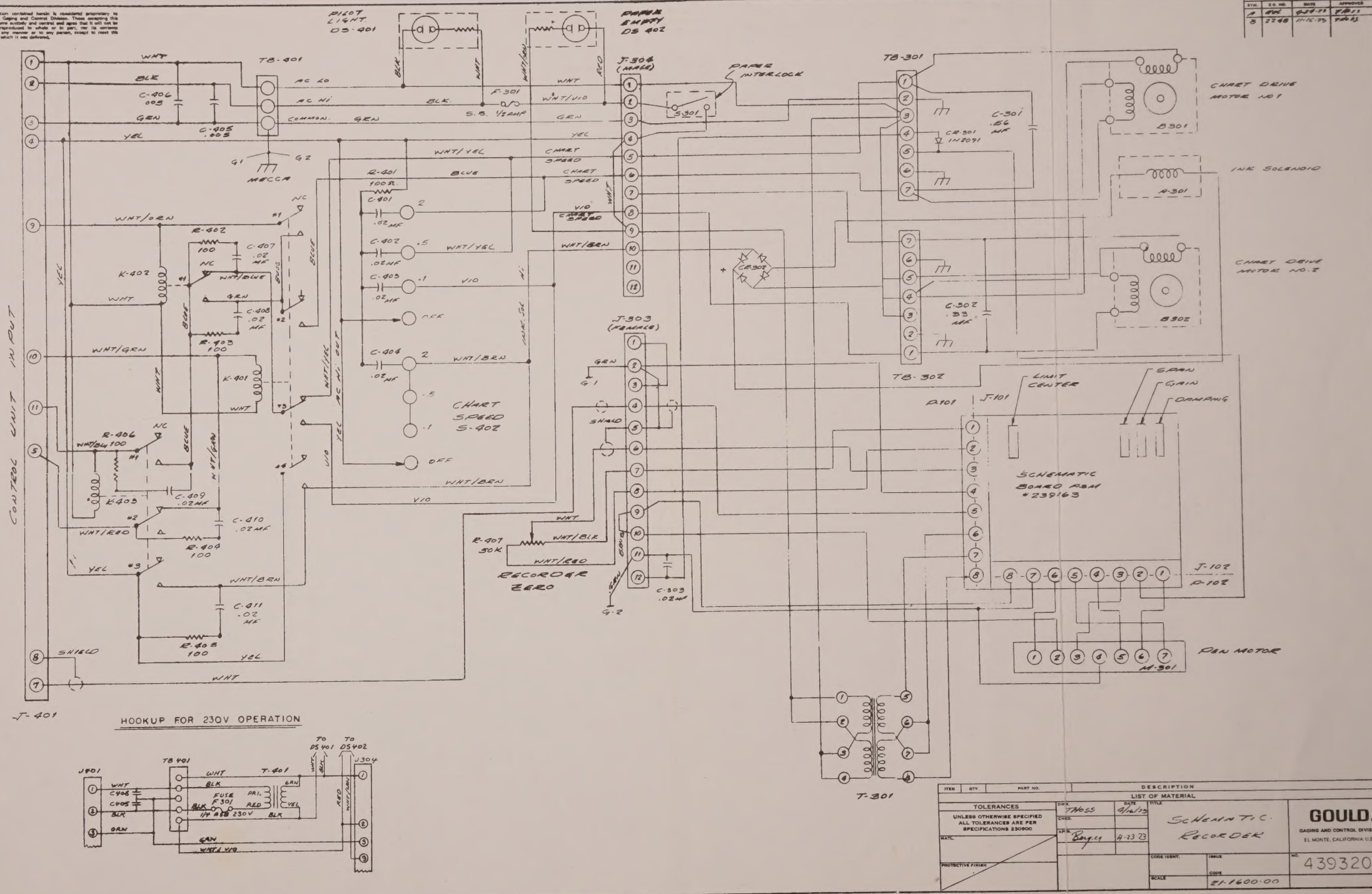


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Measurement Systems Division
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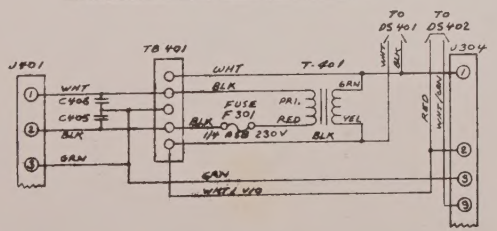
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REVISIONS			
ITEM	QTY.	DATE	APPROVED
1	800	8-28-75	T.B.S.
2	2348	11-15-75	T.B.S.



HOOKUP FOR 230V OPERATION



ITEM		QTY.		PART NO.		DESCRIPTION				
						LIST OF MATERIAL				
TOLERANCES						DRW.	DATE	TITLE		
UNLESS OTHERWISE SPECIFIED ALL TOLERANCES ARE PER SPECIFICATIONS 230900						TH655	9/16/72	SCHEMATIC RECORDER		
						CHKD.				
MATERIAL						APR.	4-23-73	Gould INC. GAGING AND CONTROL DIVISION EL MONTE, CALIFORNIA U.S.A.		
						Buyer				
PROTECTIVE FINISH								CODE IDENT.	ISSUE	439320
								CODE		
								SCALE	21.1600.00	

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EL MONTE, CALIFORNIA U.S.A.

MP MASTER



MA34580